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Depressive Symptoms and Perceptions of Emergency Department Care in Patients Evaluated for Acute Coronary Syndrome

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Abstract

Introduction—1 out of 8 survivors of acute coronary syndrome (ACS) events develop posttraumatic stress disorder (PTSD) and these individuals have a doubling of risk for recurrent ACS and mortality. Overcrowding in the emergency department (ED) during ACS evaluation has been associated with increased risk for PTSD, and depressed patients have been found to be particularly vulnerable. Little is known about the mechanisms by which overcrowding increases PTSD risk in depressed patients. Our aim was to evaluate one possible mechanism, patient perception of crowding and care, in depressed and non-depressed ED patients evaluated for ACS.

Methods—We enrolled 912 participants in the REactions to Acute Care and Hospitalization study (REACH), an ongoing observational cohort study assessing patients evaluated for ACS. Participants completed the Emergency Department Perceptions questionnaire. Depressive

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symptoms were screened using the Personal Health Questionnaire Depression Scale (PHQ 8). Objective ED crowding was calculated using the emergency department work index (EDWIN)

Results—EDWIN scores did not significantly differ between groups. Though perceptions of ED crowding did not differ between groups, depressed patients perceived the ED as more stressful [$t=4.45$, $p<.001$] and perceived poorer care [$t=3.03$, $p=.003$]. Multiple regression modeling found a significant interaction between EDWIN scores and depression predicting participants' perception of stress in the ED $F(7,904)=7.93$, $p<.001$.

Discussion—We found depressed patients experienced the emergency department as more stressful as objectively measured crowding increased. Our study highlights the complex interplay between cardiovascular disease and mental health in impacting patient health outcomes in the emergency department.

Keywords

Depression; Acute Coronary Syndrome; PTSD

Introduction

Patients evaluated for life threatening illnesses such as acute coronary syndrome (ACS; myocardial infarction, unstable angina) may experience significant stress during their emergency department evaluation, leading to adverse psychological and cardiovascular outcomes. An estimated 1 out of 8 survivors of ACS progress to develop posttraumatic stress disorder (PTSD) and these individuals have a doubling of risk for recurrent ACS and mortality following the initial ACS event.^{1–3}

The emergency department (ED) is the first point of entry for most patients treated for ACS.^{4–5} ED patients evaluated for ACS may be exposed to crowded and at times chaotic EDs for prolonged periods of time while undergoing observation and care. This clinical environment may have a deleterious impact on the psychological and cardiovascular health of patients. Past work has found that overcrowding in the emergency department during ACS evaluation is associated with greater PTSD symptoms on follow-up,⁶ and many of the stress-provoking ED environmental factors that contribute to subsequent PTSD risk have been identified.^{7–10} Given the harmful medical and psychological outcomes associated with PTSD, an understanding of which patients evaluated for ACS are at elevated risk for the stress-inducing effects of ED overcrowding is critical for ED care providers and administrators.

Depressed patients evaluated for ACS may be particularly vulnerable to the impact of overcrowding. Recent work has found that ACS patients with current depression developed significantly greater PTSD symptoms under conditions of ED overcrowding compared to nondepressed patients.¹¹ This interaction between ED overcrowding and depression on PTSD supports the diathesis-stress model of PTSD development, which proposes that individuals with a diathesis or vulnerability for the development of PTSD are at elevated risk for PTSD development when exposed to an external stress, which crosses the threshold necessary to activate the diathesis.¹² An understanding of the mechanisms by which ED

overcrowding increases PTSD symptoms in ACS patients with depression would help hospital staff improve outcomes in this particularly vulnerable ED group.

A significant body of work has found that depression is a powerful predictor of subsequent PTSD,^{13–15} and there appears to be an interaction of depression and ED overcrowding on subsequent PTSD development,¹⁶ but little is known about the mechanisms by which ED overcrowding differentially influences PTSD risk in ACS patients with depression. We propose two possible explanations: either depressed patients perceive the emergency department as more crowded than their non-depressed counterparts, and thus experience the ED and ACS event as more stressful, or they perceive the emergency department as similarly crowded, but experience those similar levels of crowding as more stressful than their non-depressed counterparts.

Past cognitive and clinical psychology studies have documented the presence of negative cognitive biases in depressed patients, with depressed patients interpreting environmental or social interactions as more negative or threatening compared to non-depressed individuals.^{17–19} These perceptions may play a significant role in how depressed patients view their ED care experience while being treated for a potential ACS event, thus increasing their risk for the development of PTSD. No previous studies have explored the association between preexisting depressive symptoms and perceptions of ED care, in real time, as participants are being evaluated for an ACS event.

The goal of our study was to evaluate the real time perception of crowding, stress, and other aspects of ED care in a cohort of depressed and non-depressed patients being evaluated for ACS in the ED setting. Our hypothesis was that depressed patients would have significantly more negative perceptions of ED care and greater stress during ED evaluation compared to nondepressed patients, independent of objective crowding metrics. We tested whether depressed patients perceived the emergency department as more crowded than their nondepressed counterparts, or alternatively, whether depressed and nondepressed patients perceived similar levels of crowding, but perceived higher levels of crowding as more stressful than their nondepressed counterparts.

Methods

We analyzed data from participants enrolled in the ongoing REactions to Acute Care and Hospitalization study (REACH), an ongoing observational cohort study evaluating patients being evaluated for ACS in a single site urban academic medical center emergency department with 24 hour cardiology and psychiatric services. Patients were eligible for the study if the treating ED physician identified the patient as “probable ACS.” Exclusion criteria included ST elevations on electrocardiogram in the ED, given that the existence of a rapid emergency protocol and transfer to the cardiac catheterization laboratory made enrollment in the emergency department impossible. Patients were also excluded from participation if they were deemed unable to comply with the study protocol (e.g., due to dementia or substance abuse), in need of immediate psychiatric intervention, or unavailable for follow-up (e.g., due to terminal non-cardiovascular illness). This research protocol was

reviewed and approved by the Columbia University Institutional Review Board. Written informed consent and a HIPPA waiver was obtained from study participants.

In the emergency department, research coordinators evaluated participant's perceptions of the ED using the Emergency Department Perceptions questionnaire at study enrollment.²⁰ The questionnaire includes items assessing patient perception of ED crowding and stressfulness, and the participant's length of stay and wait for a care plan. Participants were screened for past 2 week depressive symptoms using the eight-item Personal Health Questionnaire Depression Scale (PHQ 8),²¹ This tool has excellent sensitivity (88%) and specificity (88%) for depression, with the screening cutoff of 10 as the optimal score to balance sensitivity and specificity.²² We used that cutoff to categorize patients as depressed.

Objective ED crowding at each participant's initial ED evaluation was calculated using the emergency department work index (EDWIN).²³ The EDWIN score is a tool commonly used across emergency departments to quantitatively assess ED crowding, volume, and staffing.²⁴ From the medical record, we also documented demographic and clinical covariates including age, sex, Global Registry of Acute Coronary Events (GRACE) risk score (a post-discharge prediction model for 6-month mortality in patients with cardiac disease derived from a multinational registry)²⁴, and Charlson comorbidity index, a tool that documents a range of comorbid conditions, such as heart disease, AIDS, or cancer (a total of 22 conditions), and is used to predict one-year mortality risk.^{25,26}

Statistical analysis

We first compared depressed and nondepressed participants on demographic and clinical variables, objective ED crowding, and perceptions of ED environment and care using chi-square (for binary variables) or t-tests (for continuous variables) to test for any statistically significant group differences between depressed and non-depressed patients. Next, we used multiple linear regression with participants' perceptions of ED stressfulness as the dependent variable. Multiple regression models are used to determine the unique contribution of predictor variables (i.e., independent variables) to the explanation of variability in the dependent variable, by holding constant (i.e., adjusting or controlling for) the contributions of other contributors (i.e., covariates). Important for the present analysis, multiple regression allows for tests of statistical moderation, which is occasionally termed "effect modification," by testing whether the interaction of two variables in the model adds statistically significant explanatory value to the model. In this study, we tested whether the relationship of objective ED crowding with patients' perception of ED stressfulness was different in depressed versus nondepressed participants (by testing an interaction term of EDWIN score and depression status). In the multiple regression model, we adjusted for demographic (e.g. age, sex, ethnicity, race) and clinical covariates (GRACE cardiac risk score, Charlson comorbidity score), in order to ensure that any depression group differences or the interaction of depression and crowding was not better explained by these demographic or clinical variables that may themselves increase participants' perceived stress (and may be related to depression status).

Results

Participant characteristics

Of the 943 participants enrolled, 912 had complete data for all variables in the multiple regression model. Thirty one participants were missing depression data, but participants with missing data did not differ significantly from those who were not missing data on any of the study variables. Table 1 provides details on demographic and clinical characteristics of the sample, by depression group. Depressed participants were significantly ($p < .05$) more likely to be women and less likely to be Hispanic than non-depressed participants, but there were no other group differences.

Objective ED crowding

EDWIN scores did not significantly differ between depressed and non-depressed groups (mean 1.37 SD .05 in both groups), suggesting no difference in ED crowding between groups.

Participant perceptions

An independent samples t-test was used to test for group differences between depressed and nondepressed patients (defined as PHQ-8 Scores over 10) with regards to perceptions of patient care and experience in the emergency department. Though perceptions of emergency room crowding did not differ [$t = 0.89$, $p = .39$], depressed patients perceived the emergency department as more stressful [2.8 vs 2.4 ; $t = 4.45$, $p < .001$], perceived a one hour longer length of stay [19.5 vs 18.5 hours; $t = 3.03$, $p = .003$], and a 1.7 hour longer wait for a care plan [9.5 vs 7.8 hours; $t = 2.88$, $p = .004$]. (See Table 1).

Differential association of objective crowding with stress perception in depressed participants

In a multiple regression model, $F(7,904) = 7.93$, $p < .001$, $R^2 \text{ adj} = .05$, that included age, sex, GRACE cardiac risk score, Charlson comorbidity index, depression status (PHQ-8 ≥ 10), EDWIN score at ED admission, and the interaction of EDWIN score and depression status, only age, sex, and the interaction of EDWIN and depression were significant predictors of participants' perception of the stressfulness of the ED (see Table 2). Greater objective ED crowding was associated with greater perceptions of stress by all patients, but the relationship was particularly strong for depressed patients. This suggests that depressed patients may be more sensitive to increases in ED crowding than nondepressed patients.

Discussion

Our study found that in a cohort of patients evaluated for ACS in the emergency department, patients with depressive symptoms experience the emergency department as more stressful than do nondepressed patients, and perceive their length of stay and time to a care plan as longer. Importantly, we were able to address an important open question from prior research by assessing participants' experiences *during* their ED evaluation for ACS.

Past work has found that ACS patients with depression are at increased risk for the development of PTSD symptoms when they are evaluated in an overcrowded emergency department. This study found that the heightened vulnerability to ED crowding in depressed patients is not due to depressed patients perceiving the emergency department as more crowded than nondepressed patients, as depressed and nondepressed participants perceived crowding levels identically. Instead, we found that depressed patients experienced high levels of crowding in the emergency department as significantly more stressful than their nondepressed counterparts, even if the objective degree of crowding experienced by the two groups was identical.

Implications for Emergency Nurses

These findings have several implications for the practicing acute nurse provider. First, such findings highlight the importance of the subjective experience of the patient during their evaluation in the emergency department and its potential negative impact on their subsequent psychological and cardiovascular well being. As nurses on the frontline, an increased awareness of the complex interplay between cardiovascular disease and mental health will enable providers to improve risk screening and the design of management strategies to improve outcomes in this vulnerable population. Secondly, the identification of this association between depression and perceptions of stress during ED care raises our awareness of the complex interplay between medical diseases, mental illness, and the clinical environment in which care is delivered. ED overcrowding is a phenomena faced across hospitals nationwide, with significant negative effects on the psychological and overall well being of patients. Knowledge of the presence of particularly vulnerable groups such as depressed patients will ideally encourage the future development of targeted interventions to provide support to these patients during their medical evaluation. This multidisciplinary approach to care for patients being evaluated for ACS may ultimately improve outcomes across a range of areas from cardiovascular to mental health.

Numerous potential directions are possible. Future work integrating psychological assessments into standard cardiac assessments of patients at triage or during primary nursing evaluation may identify cardiac patients with concurrent depressive symptoms who may benefit from further psychological assessment or support during their cardiac evaluation. The relationship of variables such as pre-existing psychiatric disease or concomitant medication may be explored to understand potential core drivers of the association between depression and perception of care during medical evaluation. Perhaps greater than any other member of the clinical team, the staff nurse is the provider most frequently at the bedside and capable of best understanding the medical and psychological health of her/his patient. Identification of the increased vulnerability of depressed cardiac patients during evaluation reiterates the importance of clinicians taking the time to address the patient's immediate psychological fears and concerns alongside their medical evaluation. Past work has found that cardiac patients with increased perceptions of threat during medical evaluation perceive poorer clinician-patient communication.⁷ Bedside interventions to improve communication during medical evaluation may provide the additional support that these patients may benefit from. Such interventions may range from unstructured efforts at the bedside by clinicians to provide reassurance to semi-structured brief interventions to reduce patient anxiety during

medical care. With proper training staff nurses have been found to be capable and effective at delivering brief psychological interventions such as directed cognitive-behavioral therapy for such conditions as insomnia or depression suggesting that staff nurses may play a critical role in reducing increased perceptions of stress or anxiety in cardiac patients with depression.^{27,28} Additionally, while ED overcrowding is a significant challenge affecting emergency departments nationwide, future work may identify modifiable factors associated with crowding that may help improve outcomes in this subset of cardiac patients. For example, awareness of the increased vulnerability of depressed cardiac patients may guide nursing and ED leadership to consider psychological symptoms alongside cardiac measures in assessing potential triage decisions regarding patient care location or ratios where space is limited.

Limitations

There were several limitations to our study. This was a single-site study limited to ED patients presenting with ACS symptoms, so findings may not be generalizable to different patient populations. Additionally, measures of patient's perception of stress and ED experience were self-reported. However, we were able to objectively quantify ED crowding using administrative records, which increases confidence in the findings.

Conclusions

The evaluation for life threatening illnesses such as ACS in the ED setting is often a stressful and anxiety provoking experience for many patients, which in turn may carry significant psychological and cardiovascular risk. Environmental factors such as overcrowding may particularly exacerbate the stress that patients experience, and some patients may be particularly vulnerable to environmental influences. In this study, we found that patients with depression experienced crowding as more stressful than nondepressed patients. Future studies should test strategies to identify psychosocial vulnerabilities such as depression, and attempt interventions aimed at supporting this vulnerable population of patients treated in the emergency department.

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Contribution to Emergency Nursing Practice

-An estimated 1 in 8 survivors of acute coronary syndrome (ACS) events proceed to develop posttraumatic stress disorder (PTSD) symptoms. Such negative psychological outcomes in these cardiac patients in turn have been associated with increased cardiac morbidity and mortality.

-Overcrowding in the emergency department (ED) has been associated with increased risk of PTSD development and depressed patients in particular appear vulnerable. This study found that currently depressed patients evaluated for ACS had significantly worse perceptions of ED care and stress during ED evaluation.

-Results from this study highlight the importance of emergency nurse providers in assessing both cardiovascular and psychological well-being when evaluating patients for potential ACS events.

Table 1

Sample characteristics by depression status.

Group Statistics		
	Not Depressed N=688 Mean (SD)	Depressed N= 255 Mean (SD)
Age	60.9 (13.3)	60.7 (12.8)
Sex	40% women	50% women
Ethnicity	50% Hispanic	40% Hispanic
Race	23% Black	23% Black
GRACE Risk Score	155.7 (44.1)	155.9 (42.5)
Charlson Comorbidity Index	16.7 (4.0)	16.4 (4.7)
EDWIN score at the time of ED admission	1.4 (0.5)	1.4 (0.5)
ED Perceptions: How crowded is the emergency room?	3.1 (1.1)	3.2 (1.1)
ED Perceptions: How stressful is the emergency room?	2.4 (1.2)	2.8 (1.2)
ED Perceptions: Length of stay in the ED, in hours	18.5 (4.8)	19.5 (4.2)
ED Perceptions: Hours from ED admission to notification of their care plan	7.8 (6.5)	9.5 (7.4)

Table 2

Multiple regression predicting participant reports of ED stressfulness

	B (SE)	p
Age	−.011 (.003)	.001
Sex	−.207 (.080)	.010
GRACE Cardiac Risk Score	.001 (.001)	.395
Charlson Comorbidity Index	−.005 (.010)	.578
Depression Status	−.109 (.010)	.665
EDWIN score at the time of ED admission	.119 (.092)	.195
Interaction of EDWIN and Depression	.378 (.173)	.029

Notes:

1. The first column denotes B, which is the unstandardized regression coefficient associated with the corresponding predictor variable, as well as the standard error (SE) of B (i.e., the variability around that estimate). An example interpretation of B from this model is that for every 1 year increase in age, the predicted ED stressfulness score was 0.01 points lower. Similarly, 1 unit change in sex (i.e., the difference between women and men—scored 0/1 for the model) was associated with a .21 decrease in ED stressfulness score.
2. ED stressfulness perceptions were assessed during the ED evaluation for ACS, depression was assessed during inpatient stay or by phone a median of 3 days after ED enrollment.